Natural Heritage & Endangered Species Program
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Spine-Crowned Clubtail

Gomphus abbreviatus

State Status: **Endangered**
Federal Status: None

DESCRIPTION OF ADULT: The Spine-Crowned Clubtail is a large, semi-aquatic insect in the order Odonata, suborder Anisoptera (the dragonflies). They are members of the family Gomphidae (the clubtails), a large, diverse group of dragonflies comprising about 100 species in North America. Clubtails are named for the lateral swelling at the tip of the abdomen that produces a club-like appearance. The extent of this swelling varies greatly, from extreme to non-existent, depending upon the species. The club is generally more pronounced in males than females. The purpose of the club is uncertain, but it may be used for displays or it may provide some aerodynamic benefits to the males. Clubtails are further distinguished from other dragonflies by their widely separated eyes, wing venation characteristics, and behavior. Many species are very elusive and thus poorly known.

The Spine-Crowned Clubtail is in the subgenus *Hylogomphus*, a group with medium-sized clubs on the tips of the abdomens. Spine-Crowned Clubtails are dark brown/black dragonflies with pale to bright yellow markings on the body and green eyes. The top of the thorax (winged and legged section behind the head) is marked with thick, pale stripes and there are broad, pale, lateral stripes on the sides of the thorax. The pale thoracic markings are bright yellow in the young adults, becoming somewhat duller as the insect matures. The dark abdomen has yellow markings on top of segments one through seven (odonate abdomens have 10 segments) and small yellow spots on the sides of those segments that form an incomplete ring at the base of each segment. There are two large bright yellow patches on each side of the club. The face is dull to bright yellowish with no markings, and the legs are black. The sexes are similar in appearance, though the females have thicker abdomens and a less developed, though still prominent, club.

Adult Spine-Crowned Clubtails range in length from 1.3 to 1.4 inches (34 mm - 35 mm), with a wingspan averaging 2.6 inches (66 mm). The fully developed nymphs average just under one inch in length (23 mm - 24 mm).

SIMILAR SPECIES: The Spine-Crowned Clubtail is one of two species in the subgenus *Hylogomphus* in Massachusetts. The other species, the Mustached Clubtail (*Gomphus adelphus*) is very similar in appearance. The easiest way to distinguish the two species in the field is by the facial markings. The Spine-Crowned Clubtail has a clear yellow face with no dark markings. On the other hand, the Mustached Clubtail has several black horizontal stripes marking its pale yellowish to greenish face. However, as in most Clubtails, the shape of the male hamules (located on the underside of the second abdominal segment) and terminal appendages (Nikula *et al.* 2003), and the female vulvar lamina (located on the underside of the eighth and ninth abdominal segments) provide the most reliable means for identification.

The nymphs can be distinguished by characteristics of the lateral lobes on the labium, as per the keys in Walker (1958), Soltesz (1996), and Needham *et al.* (1999).

HABITAT: Spine-Crowned Clubtail inhabit large streams and rivers. In Massachusetts they have been found on medium to large rivers with silty and sandy bottoms, including the Connecticut River. The nymphs are aquatic and burrow just under the sediment of the river bottom. The adults inhabit the riparian areas, forested uplands, and fields.

LIFE-HISTORY/BEHAVIOR: Spine-Crowned Clubtails have a rather short flight season with emergence beginning in late May and early June and the adults flying through July.

SPINE-CROWNED CLUBTAIL FLIGHT PERIOD

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

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Spine-Crowned Clubtails are elusive and little is known about their life history. The nymphs spend at least a year maturing, undergoing several molts during this period. They are voracious predators and feed upon a variety of aquatic life. When ready to emerge, the nymphs crawl out onto exposed rocks, emergent vegetation, partially submerged logs, or the steeper sections of river banks, where they undergo transformation to adults (a process known as eclosion). Emergence generally takes place very early in the morning, presumably to reduce exposure to predation. The cast nymphal exoskeletons, known as exuviae, are identifiable to species and can be a reliable, useful means to determine the presence of a species.

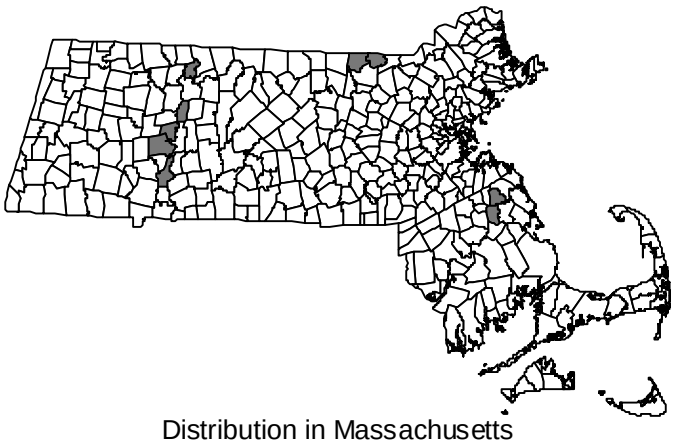
As soon as the freshly emerged adults are dry and the wings have hardened sufficiently, they fly off to seek refuge in the vegetation of adjacent uplands. Here they spend several days or more feeding and maturing, before returning to their breeding habitats. Spine-Crowned Clubtails are seldom encountered during this phase of their life; it may be that they spend most of this time high in the tree tops.

When mature, the males return to the water where they can be found resting on sandy stretches of shoreline, or perched on overhanging vegetation. Periodically they make flights out over the water, a foot or so above the surface, with frequent periods of hovering, presumably in search of females. Brief chases between competing males are frequent. Females generally appear at water only for a brief period when they are ready to mate and lay eggs. When a male encounters a female, he attempts to grasp the back of her head with claspers located on the end of his abdomen. If the female is receptive, she allows the male to grasp her, then curls the tip of her abdomen upward to connect with the male's sexual organs located on the underside of the second abdominal segment, thus forming the familiar heart-shaped "wheel" typical of all Odonata — the male above, the female upside down underneath. In this position, the pair flies off to mate, generally hidden high in nearby trees where they are less vulnerable to predators. The duration of mating in Spine-Crowned Clubtails has not been recorded, but in similar-sized odonates typically ranges from several minutes to an hour or more.

Females oviposit (lay eggs) by flying low over the water, periodically striking the surface with the tips of the abdomen to wash off the eggs. It is not known how long the eggs of Spine-Crowned Clubtails take to develop.

RANGE: Spine-Crowned Clubtails are found only in the northeastern United States, from southwestern Maine and New Hampshire, south to North Carolina and west to Ohio. In New England they have been recorded from southwestern Maine, southern New Hampshire, Massachusetts, Connecticut, and Rhode Island.

POPULATION STATUS IN MASSACHUSETTS: The Spine-Crowned Clubtail is listed as an Endangered species in Massachusetts. As with all species listed in Massachusetts, individuals of the species are protected from take (picking, collecting, killing, etc…) and sale under the Massachusetts Endangered Species Act. This species has been recorded from the several rivers, including the Connecticut River. There is one historical record from North Reading and another from Provincetown.



Distribution in Massachusetts
1977 - 2002
Based on records in Natural Heritage Database

MANAGEMENT RECOMMENDATIONS: As for many rare species, the exact management needs of Spine-Crowned Clubtails are not known. Water quality is a primary concern. Potential threats to the water quality of the Connecticut River include industrial pollution and sewage overflow, salt and other road contaminant run-off, and siltation from construction or erosion. The disruption of natural flooding regimes by dams and water diversion projects may have a negative impact on odonate populations. Extensive use of the river by power boats and jet skis is a serious concern, particularly during the early summer emergence period of Spine-Crowned Clubtails (as well as several other clubtail species). Many species of clubtails, and other riverine odonates, undergo their emergence low over the water surface on exposed rocks or vegetation, or on the river bank where they are imperiled by the wakes of high-speed watercraft. Low-level recreational use from fishermen and canoeists probably has little impact on odonate populations, but should be monitored. The upland borders of these river systems are also crucial to the well-being of odonate populations as they are critical for feeding, resting, and maturation. Development of these areas should be discouraged and preservation of the remaining undeveloped upland bordering the river should be a top priority.

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